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NOTES ON THE NAIAD FAUNA OF THE UPPER MISSISSIPPI RIVER. *

II. THE NAIADES OF THE UPPER MISSISSIPPI DRAINAGE. †

BY N. M. GRIER AND J. F. MUELLER.

(Continued from page 49.)

23. *Pleurobema pyramidatum* (Lam.)=*Q. pyramidatum* (Lam.)
Simpson—north in the Mississippi to Prairie du Chien, Wisconsin. We collected specimens of it in L. Pepin.

24. *Pleurobema clava* (Lam.).

Simpson's records of this species from Minnesota and Iowa are considered doubtful (see Ortmann, 1). It may be present nearer the Ohio. Probably of a tributary type.

25. *Elliptio crassidens* (Lam.)=*Unio crassidens* (Lam.).

Reported by Holzinger (7) from Winona County, Minn.

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†Contribution from U. S. Biological Station, Fairport, Iowa, and Biological Laboratory Washington and Jefferson College.

We also found this species at Red Wing, nearly 80 miles above this point. Absent from L. Pepin; more abundant above that point. Not common.

26. *Elliptio dilatatus* (Raf.)=*Unio gibbosus* (Barnes).

Simpson—entire Mississippi drainage. Apparently clammed out in the vicinity of Red Wing, but abundant in L. Pepin, decreasing in numbers descending the river. Not reported from N. and C. Minnesota.

Sub-Family ANODONTINAE.

27. *Arcidens confragosus* (Say).

Simpson—Mississippi river and states adjoining it. Reported from Iowa by Baker (1); S. Minnesota by Grant (6). Collected by us near Red Wing. Comparatively rare.

28. *Lasmigona compressa* (Lea)=*Symphynota compressa* (Lea).

Simpson—E. Iowa and Wisconsin. Wilson and Danglede, Mississippi R. above Bemidji and Bemidji Lake. We did not observe it between Red Wing and La Moille, Minn.

29. *Lasmigona costata* (Raf.)=*S. costata* (Raf.)

Simpson—Upper Mississippi drainage, and St. Lawrence. Wilson and Danglede, Red River of the North. Rare. We secured specimens of this only above L. Pepin.

30. *Lasmigona complanata* (Barnes)=*S. complanata* (Barnes).

Simpson—Upper Mississippi drainage, St. Lawrence. Wilson and Danglede(18), Crow Wing drainage, Minn. Common. A var. *katharinae* (Simpson) is found in the Red River of this North, it may be later found in the Upper Mississippi, although it has not been reported from there as yet.

31. *Anodonta imbecillis* (Say).

Wilson and Danglede (18), L. Minnewaska, Minn. Simpson—entire Mississippi drainage area.

32. *Anodonta grandis* (Say).

Simpson—entire Mississippi River system. By some, it is believed to be a tributary form rarely found in the river. It is often confused with *corpulenta*, Call insisting they are the same species. Var. *benedictensis* (Lea) reported by Wilson and Dan-

glade from L. Minnewaska; var. *gigantea* (Lea) reported by Call; var. *pepiniana* (Lea) reported by Wilson and Danglade from lakes of Crow Wing drainage, Minn. var. *kennicotti* (Lea) by the latter from L. Osakis are all considered by Ortmann as doubtful forms.

33. *Anodonta corpulenta* (Cooper).

Simpson—Upper Mississippi drainage. Wilson and Danglade, St. Croix drainage. In our experience somewhat more abundant than *grandis*.

34. *Anodonta suborbiculata* (Say).

Simpson—Iowa, Illinois and South. Rare in the main river, but somewhat fairly common in the sloughs, especially at Fairport, Iowa.

35. *Anodontoides ferussacianus* (Lea).

Simpson—Upper Mississippi drainage area generally, but as Ortmann, (10) points out its range is more northern. The variety *buchanensis* (Lea) appears to be an old female of *ferussacianus*. It has been reported from the Red River of the North and Crow Wing drainage by Wilson and Danglade. *A. modestus*, reported by the latter from the lakes of the Minnesota River drainage is thought by Ortmann to be a dwarf form of *A. ferussacianus*.

36. *Simpsoniconcha ambigua* (Say)=*Hemilastina ambigua* (Say).

The U. S. Biological Station records this from the Upper Mississippi River at Fairport, Iowa.

37. *Alasmidonta calceola* (Lea).

Simpson—Upper Mississippi drainage. Collected by us near Fountain City, Wis. Rare.

38. *Alasmidonta marginata* (Say).

Simpson—Upper Mississippi and St. Lawrence drainage. Collected by us near Wabasha, Minn. Local in distribution.

39. *Strophitus endentulus* (Say).

Simpson—entire Upper Mississippi drainage. Fairly common. Var. *pavonius* is simply a rayed form of the preceding species, observed according to Mr. H. W. Clark where the water is clearer, and is not entitled to varietal distinction.

Sub Family LAMPSILINAE

40. *Obliquaria reflexa* (Raf.).

Simpson—Mississippi drainage. Red Wing, Minn. where we collected it apparently represents its northernmost distribution as Wilson and Danglade do not report it from C. and N. Minnesota. Never abundant.

41. *Plagiola lineolata* (Raf.)=*Plagiola securis* (Lea).

Simpson—Upper Mississippi drainage as far south as the Arkansas and Tennessee rivers. Always taken from mussel beds and apparently attains a great age. Abundant locally.

42. *Truncilla truncata* (Raf.)=*Plagiola elegans* (Lea).

Distribution largely that of the preceding species.

43. *Truncilla donaciformis* (Lea)=*Plagiola donaciformis* (Lea).

Distribution largely that of the preceding species.

44. *Leptodea leptodon* (Raf.)=*Lampsilis leptodon* (Raf.).

Simpson—Upper Mississippi drainage south to Tennessee River. Found by Baker, (1), and Pratt, (13) in Iowa, but possibly more abundant toward the Ohio. Not observed, but Mr. Clark reports one dead shell from main river above Fairport, Iowa.

45. *Leptodea fragilis* (Barnes)=*Lampsilis gracilis* (Barnes).

Simpson—entire Mississippi drainage. In our experience more abundant in lower portions of the river.

46. *Proptera alata* (Say)=*Lampsilis alata* (Say).

Simpson—entire Mississippi drainage as far south as Arkansas. Common.

47. *Proptera lævissima* (Lea)=*L. lævissima* (Lea).

Distribution largely that of preceding species. Many specimens were found on sand bars.

48. *Proptera capax* (Green)=*Lampsilis capax* (Green).

The type locality of this species is the falls of St. Anthony, Minn. Holzinger (7) reports it from Winona, Minn., but the consensus of opinion is that it ordinarily does not go much north of Davenport, Iowa.

49. *Obovaria rectusa* (Lam.)

The evidence indicates that if this species is present in the

Upper Mississippi drainage, it is restricted to the regions near the Ohio.

50. *Obovaria olivaria* (Raf.)=*Obovaria ellipsis* (Lea).

Simpson—Upper Mississippi drainage as far south as the Arkansas and Tennessee Rivers. Collected by us near Red Wing, Minn. Rare in L. Pepin and as Ortmann (10) indicates, it prefers strong steady currents. More abundant further down stream. Not reported from N. and C. Minnesota.

51. *Actinonaias carinata* (Barnes)=*Lampsilis ligamentina* (Lam.).

Throughout the Upper Mississippi drainage, but rare in L. Pepin. Fairly common. Reported from the Crow Wing drainage by Wilson and Danglede.

52. *Carunculina parva* (Barnes)=*Lampsilis parva* (Barnes).

Lake Pepin. Reported from S. Minnesota by Call, (3). Becomes more common descending the river. Not reported from N. and C. Minnesota.

53. *Ligumia ellipsiformis* (Con.)=*L. ellipsiformis* (Conr.).

Simpson—Upper Mississippi Valley south to 38° latitude. Geiser (5), and Pratt (13), report it from Iowa. We did not collect it north of there, nor does it extend into Central and Northern Minnesota.

53a. *Ligumia subrostrata* (Say)=*L. subrostrata* (Say).

Reported by Simpson, (14) as occurring north to latitude 41°. We collected this species near Fountain City, Wis. indicating a more northerly range. Rare. Mr. Clark states it to be fairly common along the edges of the sloughs and that it is often represented by a large form originally described as *Unio mississippiensis*.

54. *Ligumis recta latissima* (Lam.)=*Lampsilis recta* (Lam.).

Common. Extending throughout the Mississippi drainage into N. and C. Minnesota. The typical *recta* is the small Great Lakes form. The typical Mississippi form is that given.

55. *Ligumia iris* (Lea)=*L. iris* (Lea).

Reported by Simpson from the St. Lawrence drainage and the Ohio drainage, Illinois and Wisconsin, indicating its pos-

sible occurrence in the Upper Mississippi. Ortmann states this form to probably be the var. *nov-eboraci*.

56. *Lampsilis anodontoides* (Lea).

Not reported from the drainages of N. and C. Minnesota, although Simpson reports it distributed throughout the entire Mississippi drainage. It was found occasionally at points between Red Wing and La Moille, Minn., except in L. Pepin, where its place is apparently taken by the next named species.

57. *Lampsilis fallaciosa* (Smith).

Occasionally species were found within the limits given for the preceding species. More abundant in L. Pepin and quieter waters such as those of the sloughs.

58. *Lampsilis siliquidea* (Barnes)=*L. luteola* (Lam.).

Simpson—entire Mississippi drainage. Abundant in L. Pepin, more so than in other parts of the river. As Ortmann (13) remarks, it prefers "rather quiet water and sandy, muddy bottoms. In these regions it apparently produces a large number of pearls."

59. *Lampsilis fasciola* (Raf.)=*L. multiradiata* (Lea).

Simpson—entire Ohio River drainage. Ortmann reports it from the Illinois River in Illinois. There is thus a fair probability of being found in the lower stretches of the Upper Mississippi River.

60. *Lampsilis ventricosa* (Barnes).

Abundant. Wilson and Danglade (18) report it from the St. Croix, Minn., Crow Wing and Red River of the north drainages. Simpson—entire Mississippi drainage. In connection with this list, it should be remembered that the Crow Wing is the modern representative of the headwaters of the Mississippi.

61. *Lampsilis orbiculata* (Hildreth).

Reported by Baker (1) from McGregor, Iowa. This at present seems to be its most northern record. Rare. It probably intergrades with the next species.

62. *Lampsilis higginsii* (Lea).

This species was collected at Red Wing, Minn., L. Pepin and points near Winona, Wis. Not reported from C. and N. Min-

nesota. Comparatively rare. The type locality is Muscatine, Iowa. The var. *grandis* does not seem to be clearly distinguished from its parent species.

63. *Dysnomia (Truncilopsis) triquetra* (Raf.)=*Truncilla triquetra* (Raf.).

Reported from Iowa by Pratt (13) and Witter (19). We collected two specimens in L. Pepin—an expansion of the Mississippi in S. Minnesota. This probably represents the most northerly record. Reported from Fairport, Iowa, by Mr. H. W. Clark.

In conclusion, acknowledgment is made to Dr. A. E. Ortman, Carnegie Museum, Pittsburgh, Pa., Mr. H. W. Clark, U. S. Biological Station, Fairport, Iowa, and Dr. Bryant Walker, Detroit, Michigan, for criticisms kindly given toward the preparation of this manuscript.

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SILAS C. WHEAT.

Silas C. Wheat, well known to many conchologists, died at Middlebury, Vt., September 1, 1922. Although nearly 70 years of age, he apparently was hale and hearty and enjoying a summer's vacation when he suffered a stroke, dying almost immediately.

Mr. Wheat was born in Franklin, Delaware Co., N. Y., in 1853, where he graduated from the Franklin Academy and then attended the New York University School of Pedagogy, qualifying as a teacher. He taught in New York City, was principal